

REMARKS

This paper is in response to the official action of November 30, 2005, wherein the restriction requirement was maintained and made final, claims 4 and 17 were objected to, claims 4-13 and 17 [sic-claims 1-3 and 14-16- were withdrawn from consideration, and claims 4-13 and 17-19 were rejected. Reconsideration is requested.

The applicant has carefully reviewed and considered the official action and the references relied upon by the examiner. Entry of the foregoing amendments is respectfully requested. Claims 1-3 and 14-16 are canceled, and claim 20 has been added. As a result, claims 4-13 and 17-20 are pending and at issue. Claims 4, 6, 17, and 19 are amended. Also the drawings, abstract, and specification have been amended in order to clarify the disclosure.

Reconsideration of the application, as amended, is respectfully solicited.

Election/Restriction

Non-elected claims 1-3 and 14-16 have been canceled.

Specification

The applicant has amended the abstract to comply with the examiner's requirement. Also, applicant has amended the specification to conform to the drawings.

Drawings

The applicant has amended Fig. 1D and also amended specification to add the reference characters in the description without adding new matter.

Claim objections

The applicant has amended 'adhering a plate having a plate in which a plurality' to 'adhering a plate in which a plurality' in claims 4 and 17 without adding new matter.

CLAIM REJECTIONS

Claim rejection - 35 U.S.C. 112

Referring to claim 6, the applicant has amended 'a compound of Ni, Co, P and B' to 'a compound that contains Ni, Co, P or B' in order to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Referring to claim 19, the applicant has amended steps d) and e) in claim 17 and amended claim 19 and new claim 20 is added in order to address the rejection.

Claim rejections - 35 U.S.C. 102 and 103

The applicant has amended claims 4 and 17 to more clearly describe the invention.

The examiner asserts that claim 4 is obvious in view of Hofmann, taken with Chen. Reconsideration is requested.

Amended claim 4 recites a method of forming metal wires, comprising the steps of a) forming a low-dielectric insulating film on a silicon substrate for which given processes are implemented, and then forming a trench in the low-dielectric insulating film, b) forming lower metal wires within the trench, c) adhering a plate in which a plurality of implantation holes are formed and a sidewall of a given height is formed at its edge, an engraved pattern for forming a plurality of trenches formed on the plate, and an engraved pattern for forming a plurality of via holes formed on the engraved pattern for forming the trench, onto a silicon substrate, d) implanting a low-dielectric insulating material through the implantation holes and then annealing the low-dielectric insulating material, e) removing the plate to obtain a

low-dielectric insulating film pattern having the plurality of the trenches shaped by the engraved pattern for forming the trenches and the plurality of the via holes shaped by the engraved pattern for forming the via holes and f) forming upper metal wires, which are connected to the lower metal wires through the via holes, within the trenches.

In the present invention, the low-dielectric insulating material pattern (e.g., element 307a) is formed by implanting the low dielectric insulating material (307) **through the implantation holes** (20c) in the plate (20).

However, in Hofmann, a low dielectric material 26 is formed above the lower metal wires then a mold 200 having a patterned surface is **pressed** together to force a portion of patterned material 202 into mass 26 (col. 4 line 40-43). The low dielectric material 28 is formed above redistribution layers 20, 22, 24 and a mold 300 having a patterned surface 302 is then **pressed** into the mass 28 to pattern the mass 28 (col. 5 line 53-54).

Also, in the present claims, a low dielectric insulating material pattern (307a) has a plurality of the trenches (308) shaped by the engraved pattern for forming the trenches and the plurality of the via holes (309) shaped by the engraved pattern for forming the via holes by using one plate (20) once. In other words, **the plate is used once** to form low dielectric insulating material pattern having the plurality of the trenches (308) and the plurality of the via holes (309). Thus, the present invention can be reduce the production cost and improve productivity.

However, in Hofmann, low dielectric material 26 having pattern of trenches 230,232,234 and 28 having pattern of a via hole 310,312,314 are formed by distinct process. In other words, the mold 200 and 300 are used to form low dielectric material pattern.

Referring to Chen, a low dielectric constant insulator 20 is formed by **deposition** (col. 6 line 11-13). Also, Chen does not show or suggest the steps c), d) and e) of the present claims.

Accordingly, the invention is clearly different from what is disclosed in Hofmann or Chen. Therefore, claims 4-13 are believed to be allowable.

The examiner asserts that claim 17 is anticipated by Hofmann or is obvious in view of Zhao taken with Hoffman.

Amended claim 17 recites a method for forming metal wires by a) forming a low-dielectric insulating film on a silicon substrate for which given processes are implemented and then forming a trench in the low-dielectric insulating film, b) forming lower metal wires within the trench, c) adhering a plate in which a plurality of first and second implantation holes are each formed and a sidewall of a given height is formed at its edge, an engraved pattern for forming a plurality of trenches formed on the plate, and an engraved pattern for forming a plurality of via holes formed on the engraved pattern for forming the trench, onto a silicon substrate, d) implanting a first insulating material of a given amount through the first implantation hole and then forming a first annealing process, e) implanting a second insulating material through the second implantation hole and then forming a second annealing process, f) removing the plate to obtain an insulating film pattern of a multi-layer structure having the plurality of the trenches shaped by the engraved pattern for forming the trenches and the plurality of the via holes shaped by the engraved pattern for forming the via holes and g) forming upper metal wires, which are connected to the lower metal wires through the via holes, within the trenches.

However, as mentioned above, Hofmann does not show or suggest that the steps of d) implanting a first insulating material of a given amount through the first implantation hole and then forming a first annealing process, e) implanting a second insulating material through the second implantation hole and then forming a second annealing process and f) removing the plate to obtain an insulating film pattern of a multi-layer structure having

the plurality of the trenches shaped by the engraved pattern for forming the trenches and the plurality of the via holes shaped by the engraved pattern for forming the via holes.

Hofmann discloses that the patterning of mass 26 is formed by compression of mass 26 with a mold 200 not implantation through the first and second implantation hole. Also, the insulating film pattern 26 and 28 in Hofmann is formed by using distinct mold 200 and 300, while the insulating film pattern of a multi-layer structure 307a in the present invention is formed by using a one plate 20.

Also, Zhao does not show or suggest steps of d), e) and f) of claim 17. Low dielectric layer pattern in Zhao is formed by etching and deposition not implanting through the implantation hole.

Also, as mentioned above, Zhao or Hofmann forms a trench and via hole by using distinct several processes, while the invention of claim 17 forms trench and via hole by using one process. Thus, the invention prevents reduction of the yield and reliability due to defects occurring in the photolithography and etches. Also, the present invention can be reduce the production cost and improve productivity.

The disclosed invention is substantially different from what is disclosed in Hofmann or Zhao. Therefore, claims are in condition for allowance.

Should the examiner wish to discuss the foregoing or any matter of form in an effort to advance this application toward allowance, he is urged to telephone the undersigned at the indicated number.

Respectfully submitted,

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IN THE DRAWINGS:

Please amend Fig. 1D as in the replacement sheet attached.